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10/538,524	06/10/2005	Kenji Kiyama	500.45104X00	3701

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EXAMINER	
ST CLAIR, ANDREW D	

ART UNIT	PAPER NUMBER
3749	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/538,524	KIYAMA ET AL.	
	Examiner	Art Unit	
	Andrew St.Clair	3749	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *18-25* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 June 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *6/10/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-16 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. Claim 1 recites terminology which is unclear, rendering the claim indefinite. First, claim 1 recites "in a back flow side of the burner." The term "back flow side" is not defined in the specification, nor does it have a conventional meaning in the art. This term renders the claim indefinite because the claimed positional limitation of the air port is unclear. Second, claim 1 recites "for a shortfall in the burner." This term is not defined in the specification. While "shortfall" considered independently is sometimes used synonymously with "error" or "short-coming," the phrase "for a shortfall in the burner" is unclear because it doesn't specify what error it is directed toward, and because it is unclear whether the combustion air is "for" remedying the error or creating it.

4. Claim 10 recites "wherein a system for supplying a part of the exhaust gas recirculation within said furnace as the nitrogen oxide inhibiting gas in a branched state." This recitation appears to by a typographical error, grammatical error, or incomplete thought. As written, it expresses no definite structure or functional limitation, thus the scope of the claim is unclear.

5. Claims 13 and 14 recite air ports "placed along a width direction of said furnace." It is unclear how an air port could be placed along a direction. It would appear that the most logical

interpretation is that the air ports are placed along a sidewall of the furnace, said air ports being aligned in the horizontal direction, however the figures show the air ports aligned in a vertical direction.

6. Claim 14 further recites "the inhibiting gas is supplied more to the air port close to the furnace center portion than the air port close to the furnace side wall in a plurality of air ports." It is unclear from this language whether applicant means the gas is supplied more often, or more in quantity. It is also unclear how any air port among a plurality aligned along the sidewalls of a furnace could be closer to the center of the furnace, or closer to the side wall. Lastly, the claim language appears to be functional claim language, yet recites no definite step of "supplying" or "providing a flow rate in X port which is greater than that of Y port," etc.

Despite the aforementioned indefiniteness, prior art is applied to the claims to the fullest extent possible for the purpose of a complete examination.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 3, and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Morita et al. (US 4,545,307).

With respect to claim 1, Morita et al. disclose a burner 55 burning a fuel within a furnace in a theoretical air ratio or less (col. 1, ln. 45-50); and an air port 57 arranged in a back flow side

of the burner (see fig. 1; see indefiniteness rejection above, Morita et al. is considered to disclose the claim limitation in that it depicts the air port in the same position as applicant depicts it) and injecting a combustion air into the furnace (col. 1, ln. 45-50), wherein an inhibiting gas supply means 57, 55, 51 for supplying a nitrogen oxide generation inhibiting gas inhibiting a nitrogen oxide from being generated is provided in a mixing region 51 formed by both of a combustion gas generated by burning the fuel by means of said burner and a combustion air injected from said air port or near the mixing region. (col. 1, ln. 45-50; Morita et al. is considered to disclose a means for supplying a NOx inhibiting gas in that it discloses the apparatus supplying various gases in a way which reduces NOx production.)

The recitation of "for a shortfall in the burner" is considered intended use and afforded no patentable weight. A recitation of the intended use of the claimed invention must result in a definite structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

With respect to claim 3, Morita et al. further disclose the claimed subject matter wherein said nitrogen oxide generation inhibiting gas is constituted by at least one gas selected from a group comprising a combustion exhaust gas, a mixed gas of the combustion exhaust gas and the air, and the air. (col. 8, ln. 38-39.)

With respect to claim 10, in light of the highly indefinite nature of the claim language, Morita et al. is considered to disclose the claim limitation in that it discloses a system for exhaust gas recirculation. (col. 8, ln. 38-39.)

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 2, 4-9, 11, and 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morita et al. (US 4,545,307) in view of Garcia-Mallol (US 5,727,480).

With respect to claims 2, 4-9, and 11-16, Morita et al. discloses the claimed subject matter with the exception of the structure of the air port 57. Morita et al. is ambiguous as to the details of the air port 57. Garcia-Mallol discloses a similar invention including an over-fire air port control system. Garcia-Mallol further discloses motivation to combine. (col 2., ln. 10-17; for precise control of fuel-air ratios and minimization of nitrous oxides.) It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the furnace and air port of Morita et al with the over-fire air port control system of Garcia-Mallol for the purpose of precisely controlling fuel-air ratios and minimizing nitrous oxides.

With respect specifically to claim 2, Garcia-Mallol discloses an inner side of said air port is separated into a flow path 28 injecting said combustion air, and a flow path injecting said nitrogen oxide generation inhibiting gas 30. (Garcia-Mallol discloses secondary air flowing from both paths 28 and 30, this secondary air is considered to be both a "combustion air" and a "nitrogen oxide generation inhibiting gas" because it completes the combustion in a system which inhibits NOx generation.)

With respect specifically to claim 4, Garcia-Mallol discloses said inhibiting gas being injected into the furnace from an outer peripheral portion side of an air injection port of said air port 30. (fig. 1, flow path 30 is on the outer periphery of the air port.)

With respect specifically to claim 5, Garcia-Mallol discloses said inhibiting gas injection port being formed in an annular shape so as to surround the air injection port of said air port. (col. 3, 14-16; flow path 30 is describes as being annular, thus surrounding flow path 28.)

With respect specifically to claim 6, Garcia-Mallol discloses said inhibiting gas injecting port arranged in a peripheral direction so as to surround the air injection port of said air port. (col. 3, 14-16; flow path 30 is describes as being annular, thus surrounding flow path 28.) With respect to the recitation of "*a plurality* of said inhibiting gas injecting ports," it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide duplicative concentric ports of the type disclosed by Garcia-Mallol because duplication of parts is considered to be *prima facie* obvious. MPEP 2144.04; *In re Harza*, 274 F.2d 669 (CCPA 1960).

With respect specifically to claim 7, Garcia-Mallol discloses said inhibiting gas injection port being formed approximately in a circular arc shape so as to surround a part of the air

injection port of said air port. (col. 3, 14-16; flow path 30 is describes as being annular, thus surrounding flow path 28.)

With respect specifically to claim 8, Garcia-Mallol discloses said inhibiting gas injection port is concentrically arranged in a part of an outer peripheral portion of the air injection port of said air port. (fig. 1, flow path 30 is on the outer periphery of the air port; col. 3, 14-16, flow path 30 is describes as being annular.) With respect to the recitation of "a plurality of said inhibiting gas injection ports," it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide duplicative concentric ports of the type disclosed by Garcia-Mallol because duplication of parts is considered to be *prima facie* obvious. MPEP 2144.04; *In re Harza*, 274 F.2d 669 (CCPA 1960).

With respect specifically to claim 9, Garcia-Mallol discloses said inhibiting gas injection port is arranged in the burner side of the air injection port of said air port. (fig. 1; flow path 30 is partially on the bottom side of flow path 28, which corresponds to the side closest to the burner.)

With respect specifically to claim 11, Garcia-Mallol discloses the use of a blower exclusively for the inhibiting gas is placed in said inhibiting gas supply system. (col. 1, ln. 37; "separate blowers...")

With respect specifically to claim 13, Morita et al. discloses a plurality of air ports placed along a width direction of said furnace (fig. 1), Garcia-Mallol discloses inhibiting gas supply means 30 and a flow rate regulating means 20b for regulating a flow rate of the inhibiting gas.

With respect specifically to claim 14, Morita et al. discloses a plurality of air ports placed along a width direction of said furnace (fig. 1), Garcia-Mallol discloses the air ports being provided with said inhibiting gas supply means 30. With respect to the limitation "the inhibiting

gas is supplied more to the air port close to the furnace center portion than the air port close to the furnace side wall in a plurality of air ports," in light of the indefiniteness rejection *supra*, Garcia-Mallol is considered to disclose this claim limitation in that the flow rates are adjustable via dampers 22a and 22b, and thus a plurality of the air ports would be capable of having any combination of relative flow rates. Functional claim language is considered to be anticipated where the prior art is capable of performing the claimed function.

With respect specifically to claim 15, Garcia-Mallol discloses a total supply flow rate of the inhibiting gas supplied to said plurality of air ports is variable in correspondence to a load of said combustion apparatus. (fig. 1; col. 3, ln. 66- col. 4, ln. 2.)

With respect specifically to claim 16, Garcia-Mallol discloses a total supply flow rate of the inhibiting gas supplied to said plurality of air ports is variable in correspondence to a nitrogen oxide discharging concentration of said combustion apparatus. (fig. 1; col. 3, ln. 66- col. 4, ln. 2; col. 3, 30-45; Garcia-Mallol is considered to disclose the claim limitation in that it discloses a variable flow rate based on the stoichiometric ratio of the burner, which is interrelated with the concentration of nitrogen oxide.)

6. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Morita et al. (US 4,545,307) in view of Kobayashi et al. (US 5,231,937).

With respect to claim 12, Morita et al. discloses the use of a mixture of air and exhaust gas, or exhaust gas alone. (col. 8, ln. 38-39.) Morita et al. does not disclose said inhibiting gas being constituted by an exhaust gas after a temperature thereof is lowered by a heat exchanger. It is old and well-known in the art to lower the temperature of an exhaust gas by means of a heat exchanger, as evidenced by Kobayashi et al. (fig. 1.) It would have been obvious to provide the

heat exchanger of Kobayashi et al. with the furnace system of Morita et al. because all of the claimed elements were known in the prior art and one skilled in the art could have combined prior art elements according to known methods with no change in their respective functions, and the combination would have yielded predictable results.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: LaRose et al (US 5,662,464), Hura et al. (US 5,915,310), Barna (US 6,145,454), Lissianski et al. (US 6,280,695), Breen et al. (US 6,357,367), Ligasacchi et al. (US 2002/0064742), Kobayashi et al. (US 2003/0099913), Taniguchi et al. (US 2006/0090677), Yamamoto et al. (US 2006/0115779).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew St.Clair whose telephone number is 571-270-3513. The examiner can normally be reached on Monday - Friday, 8 a.m. - 6 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steve Mcallister can be reached on 571-272-6785. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Andrew St.Clair
Examiner, Art Unit 3749

STEVEN B. MCALLISTER
SUPERVISORY PATENT EXAMINER